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EXPERIMENT SHOWS VALUE OF CRESTED WHEATGRASS AND RYE FOR
SPRING AND FALL PASTURAGE

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It has been demonstrated that seeding depleted spring-fall ranges in the Intermountain region to crested wheatgrass or rye is highly profitable. As the benefits become recognized livestock men are anxious to apply procedures that contribute not only to the improvement of their range but also to the general well-being of their enterprise. An experiment, which consisted of grazing mother ewes and lambs on crested wheatgrass and rye pastures, and feeding on alfalfa and barley shows the value of crested wheatgrass and rye for spring-fall pasturage. The tests were conducted in 1943 by the Intermountain Forest and Range Experiment Station in cooperation with Mr. Walter Sorenson of Ephraim, in Sanpete County, Utah. The annual precipitation here is approximately 11 inches.

Prior to planting, the land had been growing only Russianthistle. The original sage and grass cover had been killed out by heavy grazing use. The soil is rocky, shallow, and of low value for cultivation, even with irrigation. Mr. Sorenson, the owner, before planting crested wheatgrass in 1940 stated:

"The land, for the grazing use I get out of it now, no more than returns the taxes."

The taxes are approximately 6 cents per acre annually.

Thirty-six common Rambouillet ewes with single lambs were divided into three comparable groups of 12 with their lambs. On April 23 one group was put in a 6-acre crested wheatgrass pasture drilled in October 1940 at a rate of 4 pounds per acre along with a mixture of other grass species. Crested wheatgrass now produces more than 90 percent of the forage. Another group was put into an adjacent 5.8-acre rye pasture which had been drilled at the rate of about 42 pounds per acre in October 1942; and a third group was placed in the feed lot on a full ration of alfalfa hay and one-half pound of barley per ewe per day. Additional sheep were put in the rye and crested wheatgrass pastures at intervals during the spring grazing period so that utilization of the respective pastures would be about what was desired. Weights were not kept on such additions, but were figured when calculating the sheep days use. Green

growth of the crested wheatgrass and rye was approximately 6 inches high. From the standpoint of the inherent productivity, the two pastures are very similar. All ewes had been on the winter range from December 15 to March 25 and were in poor condition when brought in for lambing.

All the sheep used for gain comparisons were on the three forages from the morning of April 23 to the morning of May 18, 1943 (25 days). On the latter date they were removed from all three treatments and united. From May 18 to July 1 they grazed on fields and low foothills with a band of 175 head; July 1 to October 5 they were on the Manti National Forest in a band of 1,500 ewes and a similar number of lambs. They were weighed and tagged on April 23 at the start of the treatments; weighed again May 18 at the end of the spring treatments; and again on October 11, the end of the summer grazing season. The average weights and gains for the three dates are shown in table 1.

During September, October, and the fore part of November the crested wheatgrass produced 3 to 4 inches of nutritious, green regrowth. This pasture was grazed again from November 24 to December 5 (11 days) by 21 sheep (ten ewes, ten 7-month old lambs, and one buck). No additional grazing was obtained from the rye in the fall. The spring and summer growth of the rye was dry and bleached and valueless for grazing. New shoots were barely emerging from the fallen rye seed.

Lamb Weights and Gains Following Spring Grazing

On May 18 differences in gains made between groups of lambs were substantial and were largely attributable to the forages. The lambs on rye gained better than 3-1/2 pounds over those on crested wheatgrass and nearly 7-1/2 pounds more than those on the alfalfa hay and barley ration (table 1).

At the close of the summer grazing season, however, the gains made by the lambs that had been on rye and crested wheatgrass were nearly the same; but lambs on the two pasture treatments showed approximately a 6-pound gain over those that had been on alfalfa and barley. Because of the wide variation between lamb weights within groups on October 11 it is not possible to say whether this is a real difference or one that results from natural variability. With another year's data it will likely be possible to determine whether lambs on the pasture treatments for a month in the spring produce such an indicated gain in the fall over lambs fed alfalfa hay and barley.

Mother Ewe Weights and Gains Following Spring Grazing

During the period of the tests the mother ewes on the crested wheatgrass and rye show gains of 8 and 9 pounds respectively over those on the alfalfa and barley. The small difference between the ewes on crested wheatgrass and rye is probably largely attributable to natural differences. That the ewe gains on crested wheatgrass and rye at the close of the tests should be so similar whereas the gains of the rye lambs over those on crested

Table 1. Average weights and gains in pounds of lambs and mother ewes on crested wheatgrass pasture, on rye pasture, and on alfalfa hay and barley from April 23 to May 18.

Date	Crested wheatgrass pasture	Rye pasture	Alfalfa hay & barley
<u>Lamb Weights and Gains</u>			
Wt. April 23, start of tests	16.60	16.36	15.80
Wt. May 18, close of tests	29.20	32.73	24.70
Gain April 23 to May 18	12.60	16.37	8.90
Wt. Oct. 11, close of summer grazing	76.00	76.09	69.20
Gain April 23 to Oct 11	59.40	59.73	53.40
<u>Mother Ewe Weights and Gains</u>			
Wt. April 23, start of tests	96.40	97.36	99.09
Wt. May 18, close of tests	108.50	110.45	103.18
Gain April 23 to May 18	12.10	13.09	4.09
Wt. Oct. 11, close of summer grazing	133.30	131.64	132.54
Gain April 23 to Oct. 11	36.90	34.28	33.45

wheatgrass should be so pronounced appears peculiar. The marked difference, however, in the lamb gains between pastures probably reflects greater milk-producing qualities of the rye. During the grazing trials the rye herbage was considerably more succulent than that of the crested wheatgrass. In another year with changed weather conditions it is possible that the reverse may be true or that gains may be very similar.

At the end of the summer grazing season the ewes show very similar gains for all three treatments. This demonstrates that the mature ewes can overcome spring weight deficiencies to a large extent during the summer grazing season on the national forests.

Fall Grazing on Crested Wheatgrass

During the 11-day fall grazing period in the wheatgrass pastures the ewes gained an average of 5 pounds per head; the lambs gained an average of 4 pounds per head; and the buck lost 1 pound. These gains were made despite the fact that the sheep were in fair shape when they started to graze the crested wheatgrass.

In the Intermountain region sheep operators frequently experience a crucial need for forage in the fall as well as in the spring. Because of the quick response crested wheatgrass makes to cool temperatures and moisture, where fall storms do occur it furnishes good fall pasturage. Rye can seldom be relied on to furnish fall grazing for sheep. Consequently, crested wheatgrass is preferable to rye where fall as well as spring forage is demanded.

Grazing Capacity of the Crested Wheatgrass and Rye

For the grazing seasons in 1943 (fall and spring) approximately 169 sheep days grazing per acre were taken off the rye and 145 sheep days per acre off the crested wheatgrass. This is equivalent to 5.6 sheep months per acre for the rye and 4.8 for the crested wheatgrass. Slightly less than one sheep month per acre was thus gained off the rye over the crested wheatgrass. The crested wheatgrass, however, was a young stand being grazed for the first year, whereas the rye, being an annual was probably producing to near capacity. As the crested wheatgrass stand gets older the number of sheep it will carry per acre will likely increase. All the use was gained off the rye in the spring whereas 70 percent of the use was taken off the crested wheatgrass in the spring and 30 percent in the fall.

Cost per Sheep Month to Graze Rye and Crested Wheatgrass

It cost \$2.64 and \$2.98 per acre to bring the rye and crested wheatgrass respectively into production. This includes initial seeding costs and taxes. On the basis of the 1943 experience it will require a further annual outlay of 50 cents per acre to keep the rye productive and 6 cents per acre for taxes, or a total of 56 cents per acre. There should

be no expense to keep the crested wheatgrass productive, but there will be an annual outlay of 6 cents per acre for taxes. Thus, there is a current annual cost of 10 cents per sheep month for the rye and 1-1/4 cents for the crested wheatgrass.

Let us assume that the 1943 sheep months from the pastures are representative for a long-time period and that the accumulated sheep months up to and including any one year must refund the initial costs plus current charges to keep the pastures productive; or for example the total sheep months use for the first 5 years defrays the initial costs plus the current year's costs, and so on for succeeding years. Table 2 shows the cost per sheep month on such a basis for the first, fifth, tenth, and twentieth years compared with feeding alfalfa at \$10.00 per ton and barley at \$1.00 per hundred.

Table 2. Cost to nearest cent for cumulated sheep months use to graze the mother ewes and young lambs on crested wheatgrass and rye pastures for the first, fifth, tenth, and twentieth grazing years compared with feeding alfalfa hay and barley.

Grazing years	Cost per sheep month		
	Crested wheat- grass pasture	Rye pasture	Alfalfa hay and barley
First	0.62	0.47	0.45
Fifth	0.14	0.19	0.45
Tenth	0.07	0.15	0.45
Twentieth	0.04	0.12	0.45

For the first 10 years' use it costs 7 cents per sheep month to have grazed the crested wheatgrass and 15 cents per sheep month for the use of the rye, or a difference of 8 cents per head in favor of the crested wheatgrass. Here, where 4.8 sheep months per acre are being taken off the crested wheatgrass each year, at the end of 10 years there is a saving of \$3.84 per acre for the use of crested wheatgrass as compared with rye, or enough saved on every acre of crested wheatgrass to bring more than another acre of it into production.

The difference of course between the cost per sheep month for crested wheatgrass and rye is hypothetical in that it is based on only this one year's experience. On a more favorable situation, where rye would generally reseed itself, the costs per sheep month's use over a long period of time may be more nearly equal. It is doubtful, however, that over an extended period of time rye would prove less costly per sheep month than crested wheatgrass, because even under the best of conditions rye requires reseeding every 5 to 6 years. Although information from this one year's study indicates that lambs may make in spring somewhat better gains on rye than crested wheatgrass, the fall grazing that the crested wheatgrass provides probably more than equalizes such benefit. It is rather likely also that in another year with

different climatic conditions gains of lambs on the crested wheatgrass may be just as good as those made on rye. It must be borne in mind that these are observations taken from only one year's experience.

Table 2 makes clear that crested wheatgrass or rye pastures make possible a tremendous saving over feeding alfalfa or other supplements. The additional fact that better gains are made by mother ewes and lambs on spring and fall pastures shows that a stockman can ill afford to permit his depleted, but potentially productive, spring-fall ranges to continue in a state of low productiveness. This preliminary experiment demonstrates that by seeding crested wheatgrass or rye an operator can make unproductive spring-fall range an important and profitable part of his enterprise. Rye can be used to excellent advantage to provide quick pasturage, and at the same time provide enough forage so that other range planted to crested wheatgrass can be protected long enough to allow it to establish and start to produce. Rye stubble, after the rye has run out, may then be sown to crested wheatgrass.

Information on the limitations, how to treat, plant, and manage to get results on spring-fall ranges is available in booklet form to livestock operators. By addressing a card to the Intermountain Forest and Range Experiment Station, Ogden, Utah and briefly describing the area in question and making a request, one or more of the following guides, which outline suitable procedures for the particular situation, may be obtained without charge.

1. Increasing Livestock Production and Profits by Developing Good Spring Range.
2. How to Reseed Utah Range Lands.
3. How to Reseed Nevada Range Lands.
4. How to Reseed Idaho Range Lands.
5. Sagebrush Burning, Good and Bad.